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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,825	02/18/2005	Hidetsugu Ikeda	285358US0PCT	1651

22850 7590 01/28/2008  
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.  
1940 DUKE STREET  
ALEXANDRIA, VA 22314

EXAMINER
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CROUSE, BRETT ALAN

ART UNIT	PAPER NUMBER
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1794

NOTIFICATION DATE	DELIVERY MODE
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01/28/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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## Office Action Summary

**Application No.**

10/524,825

**Applicant(s)**

IKEDA ET AL.

**Examiner**

Brett A. Crouse

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,4-9 and 11-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-9 and 11-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>20071204;20071119</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

This office action is in response to the amendment, filed 19 November 2007, which amends claims 1, 2, 4, 5, 7, 8, 9, 11, and 12, cancels claims 3 and 10, and adds new claims 13-15. Claims 1, 2, 4-9 and 11-15 are under consideration.

#### ***Response to Amendment***

The objection to the specification is withdrawn.

The rejection of claims 3 and 10 under 35 U.S.C. 112, second paragraph, is overcome due to cancellation of the claims.

The rejection of claims 1, 2, 8 and 9 under 35 U.S.C. 102(b) as being anticipated by Shi et al., (EP 1,009,044 A2) is overcome by the amendment.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 6, 7, 14 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Shi et al., EP 1,009,044 A2, hereinafter known as Shi.

Shi teaches:

As to claims 6, 7, 14 and 15:

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Paragraph [0010], formula (I), teaches an anthracene derivative of formula (I) for an electroluminescent device.

Paragraph [0011], formulae (VI), (VII), (X), (XI), teach derivatives of formula (I) which meet the limitations of general formulae (1) and (2) of claims 1, 6, 14 and 15 of the instant invention. Formulae (X) and (XI) meet the limitations of formulae (1) and (2) when R<sub>3</sub> is aryl as provided for in the description of formula (1), paragraph [0010] and line 58, page 6, paragraph [0011]. Additionally, formulae (VI), (VII), (X), and (XI) provide substituted or unsubstituted naphthalene groups.

Paragraph [0026], attention is directed to compounds 47, 48, 50, 51, 52, 54, 55, 56, and 57.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4-9 and 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al., US 5,935,721, in view of Shi et al., US 5,972,247.

Shi '721 teaches:

Column 2, lines 15-63, teach 9,10-dinaphthyl anthracene derivatives as light emitting materials for electroluminescent devices. The passage additionally teaches an electroluminescent device comprising an anode, cathode and light emitting layer.

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Columns 11-16, compounds 14-23, provide examples of aryl substituents upon naphthyl groups bonded to the anthracene ring.

Column 48, lines 17-18, teach arylamines as dopants in the light emitting layer.

Shi '721 does not teach:

Shi '721 does not teach a central anthracene group which is 9,10 substituted in which one substituent is phenyl and one substituent is naphthyl.

Shi '247 teaches:

Column 2, line 9 through column 3, line 4, teaches a 9,10-diphenyl anthracene derivatives as light emitting materials for electroluminescent devices. The passage additionally teaches an electroluminescent device comprising an anode, cathode and light emitting layer.

It would have been obvious to one of ordinary skill in the art based on substituted di-naphthyl anthracene (N-A-N) derivatives used as blue emissive materials for the light emitting layer of an electroluminescent device and substituted di-phenyl anthracene (P-A-P) derivatives of used a blue emissive materials for the light emitting layer of an electroluminescent device that the replacement of one of the naphthyl groups of Shi '721 with a substituted phenyl group of Shi '247 would result in a 9,10-di-substituted anthracene compound (N-A-P) that would also have similar fluorescent properties as emissive materials for the light emitting layer of an electroluminescent device.

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Claims 1, 2, 4, 8, 9, 11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al., EP 1,009,044 A2 as applied to claim 6, 7, 14 and 15 above, and in view of Shi et al., US 5,935,721, and Shi et al., US 5,972,247.

The teaching of Shi (EP) as in the rejection above are relied upon.

As to claims 1, 2, 8, 9, and 13:

Shi (EP) teaches:

Paragraph [0010], teaches that is an object of the invention to provide an anthracene derivative of formula (I) for use in the hole transport layer of an electroluminescent device. The passage also recites a multilayer device structure including an anode, cathode, and a plurality of layers in which the anthracene compound of formula (I) is used.

Shi (EP) does not teach:

Shi (EP) teaches the anthracene derivative of his invention as hole transport materials. Shi does not teach compounds of formula (I) as light emitting materials. However, Shi (EP) does teach anthracene derivatives as dopants in the light emitting layer of an electroluminescent device.

Shi '721 teaches:

Column 2, lines 15-63, teach 9,10-dinaphthyl anthracene derivatives as light emitting materials for electroluminescent devices. The passage additionally teaches an electroluminescent device comprising an anode, cathode and light emitting layer.

Columns 11-16, compounds 14-23, provide examples of aryl substituents upon naphthyl groups bonded to the anthracene ring.

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Shi '247 teaches:

Column 2, line 9 through column 3, line 4, teaches a 9,10-diphenyl anthracene derivatives as light emitting materials for electroluminescent devices. The passage additionally teaches an electroluminescent device comprising an anode, cathode and light emitting layer.

It would have been obvious to one of ordinary skill in the art to expect that anthracene derivatives of Shi (EP) would provide suitable and desirable fluorescent properties to an electroluminescent device of Shi when used as fluorescent materials in the light emitting layer as taught and suggested by Shi '721 and Shi '247 due to their structural similarity with the compounds of Shi '721 and Shi '247. Shi '721 teaches a N-A-N substitution pattern and Shi '247 teaches a P-A-P substitution pattern. One of ordinary skill in the art would recognize that a N-A-P substitution pattern, as in Shi (EP), would result in compounds having similar fluorescent properties that would be useful as emissive materials as suggested in paragraph [0035] of Shi (EP) and taught for the anthracene derivatives of Shi '721 and Shi '247.

As to claims 4 and 11:

Shi (EP) teaches:

Paragraph [0032], teaches a preferred electroluminescent device structure which comprises a hole transport layer, emissive layer, electron transport layer.

Paragraph [0035], teaches that arylamines can be preferably used as dopants in the light emitting layer.

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Shi does not teach:

Shi does not provide an experimental example of a device having an arylamine in the emissive layer. However, Shi does provide examples of the preferred device structure having a hole transport layer, emissive layer, electron transport layer in which the emissive layer comprises a dopant.

It would have been obvious to one of ordinary skill in the art use an arylamine compound in the light emissive layer of the preferred device structure of Shi as a dopant material as taught by Shi.

Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al., EP 1,009,044 A2 as applied to claim 6, 7, 14 and 15 above, and in view of Shi et al., US 5,935,721, and Shi et al., US 5,972,247, as applied to claims 1, 2, 4, 8, 9, 11, and 13 above, and further in view of Ikeda et al., JP 2001-097897 hereinafter known as Ikeda.

The teachings of Shi as in the rejections above are relied upon.

Shi does not teach:

Shi does not provide an example of styryl amines as a component in the luminescent layer of an electroluminescent device. However, Shi does teach the use of aryl amines in the luminescent layer of an electroluminescent device.

Ikeda teaches:

Paragraphs [0008]-[0015], teach compounds of general formula (I) for use in electroluminescent devices. Paragraph [0014], section [2], provides a device structure of at least one organic luminous layer inter-electrode, wherein said layer comprises a



compound of formula (I). Paragraph [0014], section [5], additionally teaches that the organic luminous layer can additionally comprise a recombination site morphogenetic substance. This is held to teach that the luminous layer can comprise multiple materials such as dopants. Paragraph [0014], section [7], teaches that the luminous layer can comprise a styryl amine as the recombination site morphogenetic substance.

Paragraphs [0018]-[0034], provide an expanded description of compounds embodied by general formula (I). Paragraph [0020], provides groups represented by Ar<sub>1</sub> including anthracene. Paragraph [0024], teaches that at least one of Ar<sub>2</sub> and Ar<sub>3</sub> of general formula (I) is a naphthyl derivative. Paragraphs [0027]-[0028], teach that the naphthyl derivative can comprise additional fused rings. Examples are provided in paragraph [0028] and include naphthyl and fluoranthenyl.

Paragraphs [0120]-[0127], examples, teach electroluminescent devices having a compound of formula (I) and a styryl amine having the structure equivalent to a triarylamine with a styryl substituent (PAVB) as a component of the light emitting layer. It would have been obvious to one of ordinary skill in the art to incorporate a styryl amine, such as (PAVB), as taught by Ikeda and provided in the examples of Ikeda into the device of Shi as component of the light emitting layer with the expectation of success in forming an electroluminescent device.

Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al., US 5,935,721, in view of Shi et al., US 5,972,247, as applied to claims 1, 2, 4-9 and 11-15 above, and further in view of Ikeda et al., JP 2001-097897 hereinafter known as Ikeda.

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The teachings of Shi as in the rejections above are relied upon.

Shi does not teach:

Shi does not provide an example of styryl amines as a component in the luminescent layer of an electroluminescent device. However, Shi does teach the use of aryl amines in the luminescent layer of an electroluminescent device.

Ikeda teaches:

Paragraphs [0008]-[0015], teach compounds of general formula (I) for use in electroluminescent devices. Paragraph [0014], section [2], provides a device structure of at least one organic luminous layer inter-electrode, wherein said layer comprises a compound of formula (I). Paragraph [0014], section [5], additionally teaches that the organic luminous layer can additionally comprise a recombination site morphogenetic substance. This is held to teach that the luminous layer can comprise multiple materials such as dopants. Paragraph [0014], section [7], teaches that the luminous layer can comprise a styryl amine as the recombination site morphogenetic substance.

Paragraphs [0018]-[0034], provide an expanded description of compounds embodied by general formula (I). Paragraph [0020], provides groups represented by  $Ar_1$  including anthracene. Paragraph [0024], teaches that at least one of  $Ar_2$  and  $Ar_3$  of general formula (I) is a naphthyl derivative. Paragraphs [0027]-[0028], teach that the naphthyl derivative can comprise additional fused rings. Examples are provided in paragraph [0028] and include naphthyl and fluoranthenyl.

Paragraphs [0120]-[0127], examples, teach electroluminescent devices having a compound of formula (I) and a styryl amine having the structure equivalent to a triarylamine with a styryl substituent (PAVB) as a component of the light emitting layer. It would have been obvious to one of ordinary skill in the art to incorporate a styryl amine, such as (PAVB), as taught by Ikeda and provided in the examples of Ikeda into the device of Shi as component of the light emitting layer with the expectation of success in forming an electroluminescent device.

### ***Double Patenting***

Claims 1, 2, 4-9, and 11-15 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5, 7, 8, and 10 of copending Application No. 11/282,818. Although the conflicting claims are not identical, they are not patentably distinct from each other because the compounds and their use in an electroluminescent device significantly overlap the claims of the instant invention.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Response to Arguments***

With respect to the rejection of claims 6, 7, 14, and 15 as anticipated by Shi. The claims 6, 14 and 15 are directed to an anthracene compound and claim 7 is directed to an anthracene compound in any layer of an electroluminescent device. The compounds of Shi (EP) meet the compound limitations of the compound claims and general device claim 7. It is noted that

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applicant indicates in paragraph 4, page 2 of the remarks that the compounds of Shi "show anthracene derivatives according to Claim 1". Claim 6 of the instant invention claims solely the matching compounds of the claim 1 device.

With respect to applicant note, paragraph 1, page 3 of the remarks that Shi (EP) in paragraph [0035] does not suggest the dopants are emissive, the examiner respectfully disagrees. Paragraph [0035] of Shi (EP) teaches the band gap of the dopant must be smaller than that of the host for efficient energy transfer to the dopant. This is the known mechanism of energy transfer to an emissive dopant. Thus, Shi (EP) teaches and suggests that the dopants are used as and capable of light emission.

With regard to the argument that Shi (EP) does not teach or suggest the use of the compounds of Shi (EP), formula (1), as light emitting materials in an electroluminescent device, the examiner respectfully disagrees. Shi (EP) as noted above teaches anthracene derivatives as light emitting materials. However, to clarify the use of 9,10-diaryl substituted anthracene derivatives as light emitting materials for electroluminescent devices two additional references, both also by Shi, have been added to the rejection.

With respect to applicant's argument that Ikeda does not cure the deficiencies of Shi (EP), it is the examiner's position that Shi (EP) is not deficient and as such the combination of references teaches or suggests all elements of the rejected claims.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 2001/0051285 and US 2002/0028346 both to Shi et al., teach overlapping compounds with EP 1,009,044, Shi et al. as applied above for use as hole transport materials.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brett A. Crouse whose telephone number is 571-272-6494. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrell H. Morris can be reached on 571-272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BAC/ 9 January 2008



MILTON I. CANO  
SUPERVISORY PATENT EXAMINER